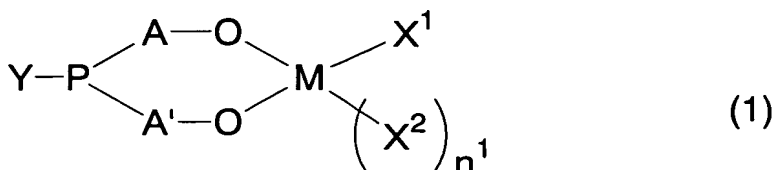


# CLAIMS

1. A transition metal complex of formula (1):



wherein M represents an element of Group 6 of Periodic Table of Elements,

A and A' are the same or different and represent  
a substituted or unsubstituted C1-10 alkylene group,  
a substituted or unsubstituted C6-18 phenylene group,  
a substituted or unsubstituted C10-20 naphthylene group,

or

a silylene group substituted with substituted or  
unsubstituted C1-20 hydrocarbon,

Y represents a substituted or unsubstituted C1-10 alkyl  
group,

a substituted or unsubstituted C7-20 aralkyl group,  
a substituted or unsubstituted C6-20 aryl group,  
a silyl group substituted with substituted or

unsubstituted C1-20 hydrocarbon,

X<sup>1</sup> and X<sup>2</sup> are the same or different and represent  
a hydrogen atom, a halogen atom,

a substituted or unsubstituted C1-10 alkyl group,  
a substituted or unsubstituted C7-20 aralkyl group,  
a substituted or unsubstituted C6-20 aryl group,  
a substituted or unsubstituted C1-10 alkoxy group,

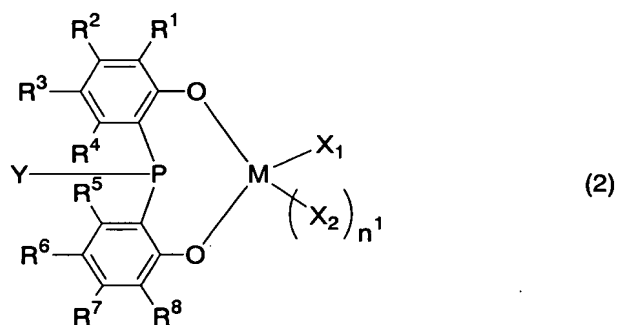
a substituted or unsubstituted C7-20 aralkyloxy group,  
a substituted or unsubstituted C6-20 aryloxy group, or  
an amino group disubstituted with C1-20 hydrocarbon, and  
 $n^1$  is an integer of 0 to 3.

5

2. The transition metal complex according to claim 1,  
wherein at least one of A and A' is a substituted or unsubstituted  
C6-20 phenylene group.

10

3. The transition metal complex according to claim 1,  
wherein the compound of formula (1) is a compound of formula  
(2):



15

wherein M represents an element of Group 6 of Periodic Table  
of Elements,

Y represents a substituted or unsubstituted C1-10 alkyl  
group,

a substituted or unsubstituted C7-20 aralkyl group,

a substituted or unsubstituted C6-20 aryl group,

20

a silyl group substituted with substituted or  
unsubstituted C1-20 hydrocarbon,

$R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ ,  $R^7$  and  $R^8$  are the same or different  
and represent a hydrogen atom, a halogen atom, an C1-10 alkyl  
group, an C1-10 alkoxy group, or

a silyl group substituted with C1-20 hydrocarbon,  
X<sup>1</sup> and X<sup>2</sup> are the same or different, and represent a hydrogen  
atom, a halogen atom,

5 a substituted or unsubstituted C1-10 alkyl group,  
a substituted or unsubstituted C7-20 aralkyl group,  
a substituted or unsubstituted C6-20 aryl group,  
a substituted or unsubstituted C1-10 alkoxy group,  
a substituted or unsubstituted C7-20 aralkyloxy group,  
a substituted or unsubstituted C6-20 aryloxy group, or  
10 an amino group disubstituted C1-20 hydrocarbon, and  
n<sup>1</sup> is an integer of 0 to 3.

4. The transition metal complex according to any one of  
claims 1 to 3, wherein Y is a substituted or unsubstituted C1-10  
15 alkyl group, or a substituted or unsubstituted C6-20 aryl group.

5. The transition metal complex according to any one of  
claims 1 to 4, wherein M is a chromium atom.

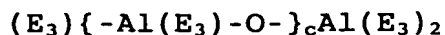
20 6. An olefin polymerization catalyst obtained by combining  
the transition metal complex as defined in any one of claims  
1 to 5 with the following compound (A),

Compound (A): any one of the following compounds (A<sub>1</sub>) to  
(A<sub>3</sub>), or a mixture of two or more of them

25 (A<sub>1</sub>): an organic aluminum compound of formula  
(E<sub>1</sub>)<sub>a</sub>Al(Z')<sub>(3-a)</sub>,

(A<sub>2</sub>): cyclic aluminoxane having a structure of formula  
{-Al(E<sub>2</sub>)-O-}<sub>b</sub>,

(A<sub>3</sub>): linear aluminoxane having a structure of formula



wherein  $E_1$  to  $E_3$  are the same or different, and represent a C1-8 hydrocarbon group,  $Z'$ 's are the same or different, and represent a hydrogen atom or a halogen atom,  $a$  represents 1, 2 or 3,  $b$  is an integer of 2 or more, and  $c$  represents an integer of 1 or more.

7. The olefin polymerization catalyst according to claim 6, which is obtained by further combining the following compound (B),

Compound (B): any one of the following compounds ( $B_1$ ) to ( $B_3$ ), or a mixture of two or more of them

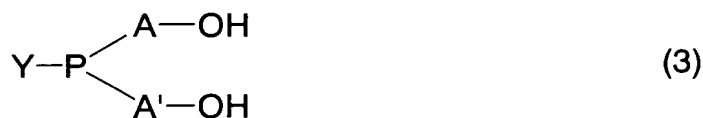
( $B_1$ ): a boron compound of formula  $BQ_1Q_2Q_3$ ,

( $B_2$ ): a boron compound of formula  $Z^+(BQ_1Q_2Q_3Q_4)^-$ ,

( $B_3$ ): a boron compound of formula  $(L-H)^+(BQ_1Q_2Q_3Q_4)^-$ ,

wherein  $B$  is a trivalent boron atom,  $Q_1$  to  $Q_4$  are the same or different and represent a halogen atom, a C1-20 hydrocarbon group, a halogenated C1-20 hydrocarbon group, a silyl group substituted with C1-20 hydrocarbon, an C1-20 alkoxy group, or an amino group disubstituted with C1-20 hydrocarbon,  $Z^+$  represents an inorganic or organic cation, and  $L$  represents a neutral Lewis base.

8. The olefin polymerization catalyst according to claim 6 or 7, wherein the transition metal complex is a reaction product obtained by reacting a compound of formula (3):



wherein  $A$  and  $A'$  are the same or different, and represent

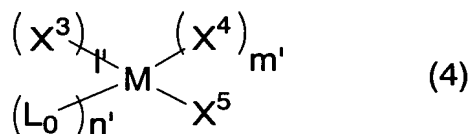
a substituted or unsubstituted C1-10 alkylene group,  
 a substituted or unsubstituted C6-18 phenylene group,  
 a substituted or unsubstituted C10-20 naphthylene group,  
 or

5 a silylene group substituted with substituted or  
 unsubstituted C1-20 hydrocarbon,

Y represents a substituted or unsubstituted C1-20 alkyl  
 group,

a substituted or unsubstituted C7-20 aralkyl group,  
 10 a substituted or unsubstituted C6-20 aryl group,  
 a substituted or unsubstituted silyl group substituted  
 with C1-20 hydrocarbon, with

a transition metal compound of formula (4):



15 wherein M represents an element of Group 6 of Periodic Table  
 of Elements,

$X^3$ ,  $X^4$  and  $X^5$  are the same or different, and represent a  
 hydrogen atom, a halogen atom,

a substituted or unsubstituted C1-10 alkyl group,  
 20 a substituted or unsubstituted C7-20 aralkyl group,  
 a substituted or unsubstituted C6-20 aryl group,  
 a substituted or unsubstituted C1-10 alkoxy group,  
 a substituted or unsubstituted C7-20 aralkyloxy group,  
 a substituted or unsubstituted C6-20 aryloxy group, or  
 25 an amino group disubstituted with C1-20 hydrocarbon,

$L_0$  represents a neutral ligand selected from ether, sulfide,  
 amine, phosphine, or olefin, and  $l'$ ,  $m'$ , and  $n'$  represent

independently an integer of 0 to 2.

9. The olefin polymerization catalyst according to claim 8, wherein the molar ratio of the compound of formula (3) and the transition metal compound of formula (4) is 1:0.1 to 1:10.

10. A process for preparing an olefin polymer, which comprises polymerizing olefin utilizing an olefin polymerization catalyst as defined in any one of claims 6 to 9.

11. A process for preparing a transition metal complex of formula (1) as defined in claim 1, which comprises reacting a compound of formula (3):



wherein A and A' are the same or different, and represent a substituted or unsubstituted C1-10 alkylene group, a substituted or unsubstituted C6-18 phenylene group, a substituted or unsubstituted C10-20 naphthylene group,

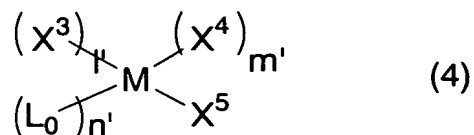
20 or

a silylene group substituted with substituted or unsubstituted C1-20 hydrocarbon,

Y represents a substituted or unsubstituted C1-10 alkyl group,

25 a substituted or unsubstituted C7-20 aralkyl group, a substituted or unsubstituted C6-20 aryl group, a silyl group substituted with substituted or

unsubstituted C1-20 hydrocarbon, with  
a transition metal compound of formula (4):



wherein M represents an element of Group 6 of Periodic Table  
of Elements,

$X^3$ ,  $X^4$  and  $X^5$  are the same or different, and represent a  
hydrogen atom, a halogen atom,

a substituted or unsubstituted C1-10 alkyl group,

a substituted or unsubstituted C7-20 aralkyl group,

a substituted or unsubstituted C6-20 aryl group,

a substituted or unsubstituted C1-10 alkoxy group,

a substituted or unsubstituted C7-20 aralkyloxy group,

a substituted or unsubstituted C6-20 aryloxy group, or

an amino group disubstituted with C1-20 hydrocarbon,

$L_0$  represents a neutral ligand selected from ether, sulfide,  
amine, phosphine or olefin, and  $l'$ ,  $m'$  and  $n'$  represent  
independently an integer of 0 to 2.